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BASF AG
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Multilayer cholesteric pigment flakes useful e.g. in paint, ink, cosmetics or optical device (Ger)

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Addnl Data: SCHUHMACHER P, SCHNEIDER N, RICHTER V, KELLER H, BLASCHKA P, BETTINGER G, MEYER F, HEILMANN P, BEST W
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NOVELTY

NOVELTY - Flaky, multilayer cholesteric pigment has layer(s) that (partly) absorb transmitted light between cholesteric layers.

DETAILED DESCRIPTION

The sequence of the layers is

A^1 B A^2

A^1, A^2 = cholesteric layer(s);

B = intermediate layer(s) that absorb part of all the light transmitted by A(s)-F4, 9-A2A, 12-W11H, D(s)-B, F(3)-E7, 5-A6P, G02-A3A, 2-A4B)

A^1 and A^2.

An INDEPENDENT CLAIM is also included for the production of the pigment.

USE

The pigments are used in compositions and coating compositions, in the vehicle and vehicle accessories field, in the outdoor, sports and games sectors; as optical devices, e.g. polarizers or filters; in cosmetics; in the textile, leather and jewelry fields; in giftware; in writing tools or spectacle frames; in the construction and domestic sectors; in printing products of all types; in the production of paints and lacquers; for incorporation in articles to inhibit falsification; and for coating consumer articles or lacquering vehicles (all claimed). The uses include packaging applications and printing on e.g. cardboard, packaging, carrier bags, paper, labels and films.

ADVANTAGE

Existing cholesteric interference pigments must either contain additional pigment to absorb the transmitted wavelength or be applied

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to a colored ground. Adding pigment largely eliminates the special advantages of interference pigments, whilst it is very difficult to produce the ideal black/mirror ground. The use of an absorbing layer between the cholesteric layers avoids these drawbacks.

EXAMPLE

A solution (A) was prepared from a cholesteric mixture containing 90.5 wt.% achiral nematic compound (or especially a mixture) of formula (I), 6.5 wt.% chiral compound of formula (II) and 3 wt.% 1-hydroxycyclohexyl phenyl ketone (Irgacure 184) as photoinitiator in methyl ethyl ketone (MEK) as solvent:

n/m = 4/4, 4/6, 6/4 and/or 6/6

Polyethylene terephthalate film with a glossy black coating on the back was given a 2 µm coating with the solution. This was dried at 60°C and cured by UV-fixing. The reflection maximum of the coating was 520 nm. A paste (70.7% solids) of 150 g carbon black (Regal 400 R), 3 g stearic acid, 80 g dispersion resin containing phosphonate (50% in tetrahydrofuran) and 40 g MEK was diluted to 25% solids with 499 g MEK and dispersed. The dispersion was mixed with 500 g 60% solution (A) and 0.3 g Byk 361 (acrylate copolymer; flow aid), mixed intensively and treated with 9 g photoinitiator (Irgacure 907). A 0.8 µm (dry) coating of this dispersion was applied to the first layer, dried and UV cured under N_2, then given a second coating of solution (A). The 3-layer composite was separated from the film base and pulverized. From both sides, the flakes, which were 6 µm thick, had a strong green color when viewed normally with a flip to blue when viewed at an angle, and had high brilliance.

TECHNOLOGY FOCUS

Imaging And Communication - Production: The pigment is produced by applying layers A^1, B and B^2 to a support, preferably drying and then curing the layers, simultaneously or consecutively. The cured layers are then removed from the support and pulverized to pigment.

Preferred Production: The coatings may be applied by (air) knife, air blade, squeezing, impregnating, reverse roller, transfer roller, gravure, kiss coating, casting, spraying, spin coating or printing, e.g. letterpress, gravure, flexographic, offset or screen printing. Casting and offset printing are especially suitable.

Inorganic Chemistry - Preferred Pigment: Layer B contains inorganic absorption pigment(s), optionally in a binder matrix.

Organic Chemistry - Preferred Pigment: Layers A^1 and A^2 have the same or different optical properties and especially reflect the same or

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different wavelengths and/or have the same or different handedness. Layer B contains organic absorption pigment(s), optionally in a binder matrix.

Polymers - Preferred Pigment: The cholesteric mixtures A^1 and A^2 are selected from (a) cholesteric polymerizable monomer(s), (b) achiral, nematic polymerizable monomer(s) and a chiral compound, (c) cholesteric cross-linkable oligomer(s) or polymer(s); (d) a cholesteric polymer in a polymerizable diluent, or (e) cholesteric polymer(s) in which the cholesteric phase can be frozen by rapid cooling below the glass transition temperature. One of these mixture is used as binder